MODULE FIVE

CUSTOMER REPORTS

Module Overview

In this module you are going to learn about traffic reports that may be selected for a specific customer. Since a Meridian SL-1 switch may have several customers it is important to have access to data about each one individually.

The topics you'll cover are:

1. Individual report description - this section will give you an explanation of each customer report that you can request.

2. Report headings - these are not printed on the report and you will learn how to determine what data is under a specific heading.

3. Data discrimination - you will learn how to identify "normal" data from questionable data.

4. Corrective actions - you will learn what may be done to rectify identified problems.

Module Objective

Given several customer reports, you should be able to identify any information on the reports that indicates possible areas of less than ideal operation. You will then select from a list the recommended procedure to rectify the possible problem. Eighty percent accuracy is required for both parts of this objective.

CUSTOMER REPORTS

The first customer report you will review is the TFC00l - CUSTOMER NETWORKS. This report details traffic within each customer group. It groups the traffic into incoming, outgoing, intra-customer, and tandem traffic and provides CCS, peg count, and FTM data on those calls for each customer. In addition, statistics for certain unsuccessful attempts are also provided. Peg is on a per call basis, rather than a per time slot basis as in the TFS00l (System Report).

EXAMPLE TFC00l CUSTOMER NETWORKS REPORT

200 TFC00l

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

Areas being reviewed on the reports will be **highlighted.** Remember that the location of the system ID (200) and the report number (TFC00l) are in the same place as the System reports.

This column is called INCOMING FTM.
If at any time between an incoming call being recognized by the system, and the time that the trunk is idled the call suffers blocking so that a given stage of the call cannot be completed, then incoming FTM is incremented. The FTM figure does not include blockage occurring between an incoming trunk and an outgoing trunk. It does, however, represent the total blockage suffered by all incoming trunks on trunk - to - station or trunk - to - attendant calls.

```
200  TFC001

00

00000          0000092          00072
00000          0000114          00074
00000          0000063          00083
00000          0000005          00003
00001            00016          00000
```

This column is called INCOMING CCS.
When an established path between any terminal and a trunk was originally incoming, the Incoming CCS is accumulated. However, this does not include usage on a connection between an incoming and an outgoing trunk (i.e. tandem connection). The usage figure represents the total usage for all incoming trunks on trunk - to - station or trunk - to - attendant calls.

```
200  TFC001

00

00000          0000092          00072
00000          0000114          00074
00000          0000063          00083
00000          0000005          00003
00001            00016          00000
```

This column is called INCOMING PC.
This count in incremented when a trunk is idled if:

a. The trunk was incoming when it was originally seized.

b. After the trunk was seized, it was involved in an established connection.

This count does not peg for connections between an incoming trunk and an outgoing trunk. However, it does represent the total peg count for all incoming trunks on trunk - to - station or trunk - to - attendant calls.

200 TFC001

00

00000	0000092	**00072**
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

If you understand everything up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

1. What column would you check to find the CCS of all incoming trunks? _____

2. What column increments when an incoming call is blocked and cannot be completed? _____

*** ANSWER ***

1. What column would you check to find the CCS of all incoming trunks? INCOMING CCS

2. What column increments when an incoming call is blocked and cannot be completed? INCOMING FTM

If you had any problems with this exercise it is recommended that you review the material presented and/or the references in the Appendix.

This column is called OUTGOING FTM.

If a path to an idle outgoing trunk cannot be found due to network blocking then the Outgoing Failure to Match is incremented. The FTM figure does not include blockage occurring between an incoming trunk and and outgoing trunk. It does, however, represent the total blockage suffered by all outgoing trunks on trunk - to - station or trunk - to - attendant calls.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

This column is called OUTGOING CCS.
When an established path is idled and one of the terminals is a trunk, then, if that trunk was outgoing when originally seized, the outgoing usage is accumulated. The usage figure does not include usage on a connection between an outgoing trunk and an incoming trunk. It does represent the total usage for all outgoing trunks on station - to - trunk or attendant - to - trunk calls.

```
200  TFC001

00

00000          0000092        00072
00000          0000114        00074
00000          0000063        00083
00000          0000005        00003
00001            00016        00000
```

This column is called OUTGOING PC.
This count is incremented when a trunk is idled if:

a. The trunk was outgoing when it was originally seized.

b. After the trunk was seized, it was involved in an established connection.

This figure does not represent connections between an incoming trunk and an outgoing trunk. It does, however, represent the total peg count for all outgoing trunks on station - to - trunk or attendant - to - trunk calls.

```
200  TFC001

00

00000          0000092        00072
00000          0000114        00074
00000          0000063        00083
00000          0000005        00003
00001            00016        00000
```

*** PRACTICE EXERCISE ***

1. The total CCS for all outgoing trunks would be found in what column? _____

2. If a path to an idle outgoing trunk cannot be found it would be indicated in what column? _____

*** ANSWER ***

1. The total CCS for all outgoing trunks would be found in what column? OUTGOING CCS

2. If a path to an idle outgoing trunk cannot be found it would be indicated in what column? OUTGOING FTM

If you understand all of the information up to this point continue.

This column is called INTRA-CUSTOMER FTM.
This count is incremented when a path cannot be found between two terminals, neither of which is a trunk. It represents the total blockage suffered by all station - to - station or station - to - attendant calls.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

This column is called INTRA-CUSTOMER CCS.
It indicates the total usage of all calls that increment Intra-customer Peg Count.

```
200  TFC001

00

00000          0000092          00072
00000          0000114          00074
00000          0000063          00083
00000          0000005          00003
00001            00016          00000
```

This column is called INTRA-CUSTOMER PC.
When an established path between two terminals, neither of which is a trunk, is idled, this count will be incremented. This count represents the total peg count for all station - to - station or station - to - attendant calls.

```
200  TFC001

00

00000          0000092          00072
00000          0000114          00074
00000          0000063          00083
00000          0000005          00003
00001            00016          00000
```

If you understand all of the information up to this point continue to the practice exercise.

*** PRACTICE EXERCISE ***

1. What column indicates the total usage of all calls that increment the intra-customer peg count? _____

2. What column would you check if two terminals (not trunks) have their established path idled? _____

3. What column would indicate when a path between two terminals (not trunks) could not be found? _____

*** ANSWER ***

1. What column indicates the total usage of all calls that increment the intra-customer peg count? INTRA-CUSTOMER CCS

2. What column would you check if two terminals (not trunks) have their established path idled? INTRA-CUSTOMER PC

3. What column would indicate when a path between two terminals (not trunks) could not be found? INTRA-CUSTOMER FTM

Refer to the NTP in the Appendix for additional information on the subjects covered up to this point.

This column is called TANDEM FTM.
If a path between two terminals, both of which are trunks, cannot be found due to network blocking, then Tandem FTM is incremented. Two attempts are made to find a path between the originating trunk and idle outgoing trunk. If both attempts fail, one Tandem FTM is counted. The FTM figure represents the total blockage suffered by all trunk - to - trunk connections. It is not included in either incoming or outgoing FTM measurements.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

This column is called TANDEM CCS .
When an established path between two terminals, both of which are trunks, is idle then tandem usage is accumulated. The usage figure represents the total usage for all trunk - to - trunk calls. Tandem usage does not increment either incoming or outgoing usage.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	**0000005**	00003
00001	00016	00000

This column is called TANDEM PC .
When an established connection between two terminals, both of which are trunks, is idled and both trunks are also to be idled, then this count is incremented. A tandem call does not increment either Incoming or Outgoing Peg Counts. Therefore, to calculate the total incoming and outgoing traffic, the tandem peg count must be added once to both the incoming and the outgoing peg counts. Likewise, add the tandem CCS and/or FTM's once to both the incoming and outgoing CCS and/or FTM's to find the total incoming and outgoing usage and/or FTM's.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	**00003**
00001	00016	00000

If you understand all of the information up to this point continue on to the practice exercise on the next page.

* PRACTICE EXERCISE *

1. What column would you check if a path between two trunk type terminals cannot be found due to network blocking? _____

2. What columns are incremented when an established connection between two terminals, both of which are trunks, is idled and both trunks are also to be idled? _____

*** ANSWER ***

1. What column would you check if a path between two trunk type terminals cannot be found due to network blocking? TANDEM FTM

2. What columns are incremented when an established connection between two terminals, both of which are trunks, is idled and both trunks are also to be idled? TANDEM PC & TANDEM CCS .

If you understand all of the information up to this point continue.

This column is called PERMANENT SIGNAL.

This count is incremented when:

1. A terminal does not start to dial within 30 seconds of receiving dial tone.

2. A terminal, other than a trunk or attendant, does not continue dialing once it has started and is placed into the line-lockout condition.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

This column is called ABANDON .
This count is incremented when a terminal, other than a trunk, goes on-hook and thus abandons the call before having completely dialed a directory number or a trunk access code. This count will not be incremented if a partial number has been outpulsed on a trunk route.

```
200  TFC001

00

00000          0000092          00072
00000          0000114          00074
00000          0000063          00083
00000          0000005          00003
00001            00016          00000
```

This column is called PARTIAL DIAL.
When a 2500 set does not complete dialing within 30 seconds this count will be incremented.

```
200  TFC001

00

00000          0000092          00072
00000          0000114          00074
00000          0000063          00083
00000          0000005          00003
00001            00016          00000
```

If you understand all of the information up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

1. What column indicates when a terminal goes on-hook and abandons the call before completely dialing a directory number? _____

2. What column is incremented if a terminal does not start to dial within 30 seconds? _____

3. What column is incremented when a 2500 set does not complete dialing within 30 seconds? _____

*** ANSWER ***

1. What column indicates a terminal goes on-hook and abandons the call before completely dialing a directory number? ABANDON

2. What column is incremented if a terminal does not start to dial within 30 seconds? PERMANENT SIGNAL

3. What column is incremented when a 2500 set does not complete dialing within 30 seconds? PARTIAL DIAL

If you had any problems with this exercise it is recommended that you review before continuing.

From the beginning of this module you have been reviewing the columns of the TFCØØ1 report. The module will now detail the data contained in these columns and their relationships.

All of the data that you will be reviewing may vary from system to system depending on traffic, size, etc.

First, take a look at what is considered to be ideal data for the TFCØØ1 report.

Ideal data may include:

- Maximum blockage for incoming, outgoing, and tandem calls is 1%.
- Maximum blockage for intra-customer calls is 4%.

If you understand everything up to this point continue on to the practice exercise.

* PRACTICE EXERCISE *

1. Ideally how many FTMs should a report have? _____
2. What is the maximum blockage for intra-customer calls? _____
3. Maximum blockage for incoming calls is? _____

*** ANSWER ***

1. Ideally how many FTMs should a report have? (Ø) ZERO

2. What is the maximum blockage for intra-customer calls? 4%

3. Maximum blockage for incoming calls is? 1%

   The recommended maximum blockage for incoming, outgoing and tandem calls is 1%, and for intracustomer calls it is 4%.

If you had any problems with this practice exercise it is recommended that you review before continuing.

All CCS, peg counts, and failures to match in this section peg on a per-call basis, rather than a per-time slot basis, as in TFSØØ1.

These measurements are incremented for only one of the two time slots involved and only for calls that reach the established state. An established path for incoming calls is defined as a connection in which answer supervision has been returned to the central office. An established path for outgoing calls is defined as a connection in which the Meridian SL-1's end - of - dialing timer has timed out, regardless of the fate of the call. Therefore, the outgoing peg count will include calls to a busy number or a ring - no - answer, as long as the EOD timer has timed out on those calls. Connections of the two types listed below are not included in the counts in TFCØØ1:

- Connections to service loops
- Connections to Digitone receivers

*** PRACTICE EXERCISE ***

Failures to match, PC, CCS peg on a per time slot basis for TFCØØ1.

TRUE or FALSE

*** ANSWER ***

Failures to match, PC, CCS peg on a per time slot basis for TFC001.

TRUE or **FALSE**

Multiplying usage and peg count measurements by two and finding the sum for each will more or less approximate the sum of terminal loop usage and peg counts in TFS001, although it will never equal it. This is because the measurements in the two sections do not peg for the same reasons or at the same times during the handling of a call. For example, the two connection - types listed above are not included in TFC001, however they are included in TFS001.

EXAMPLE:

A blocked call will peg one failure to match twice in TFS001 -- once for each time slot involved -- but only once in TFC001, depending on whether it was incoming, outgoing, intracustomer, or tandem.

Similarly, an incoming call to an attendant console that is blocked twice before it reaches its destination--once between the trunk and the console, and once between the console and the station -- will only show one failure to match in TFC001. However, TFS001 will show four loop failures to match for this call.

Failures to match between any terminal and the tone and digit switch or a Digitone receiver are not recorded in TFC001, whereas they will be recorded in TFS001.

The percentage of blockage on incoming, outgoing, intracustomer, and tandem calls can be determined from this section, using the formula:

$$\frac{\text{FTM}}{\text{Peg Count + FTM}} \text{ X 100 = \% Blockage}$$

The example below demonstrates the use of the formula utilizing an actual report:

```
104  TFC001
00
  00008    0000902    00387
  00032    0001214    00796
  00014    0000437    00496
  00000    0000054    00024
  00016      00132    00124
```

INCOMING FTM

$$\frac{8}{387 + 8} \text{ X 100 = 2.02 \% Blockage}$$

*** PRACTICE EXERCISE ***

Use the example report above to answer the following questions.

1. What is the % of blockage for outgoing calls?

2. What is the % of blockage for intracustomer calls?

3. What is the % of blockage for tandem calls?

*** ANSWER ***

1. % of blockage for outgoing calls is 3.9

$$\frac{32}{796 + 32} \times 100 = 3.9\ \%$$

2. % of blockage for intracustomer calls is 2.7

$$\frac{14}{496 + 14} \times 100 = 2.7\ \%$$

3. % of blockage for tandem calls is Ø %

$$\frac{0}{132 + 0} \times 100 = 0\ \%$$

Intra-office ratio for each customer can be calculated from this section. This is defined as the ratio of station-to-station traffic to total station traffic. The formula used is:

$$\frac{2 \times \text{Intracustomer CCS}}{\text{Incoming CCS} + \text{Outgoing CCS} + (2 \times \text{Intracustomer CCS})} =$$

EXAMPLE:

```
104  TFC001
00
  00008    0000902    00387
  00032    0001214    00796
  00014    0000437    00496
  00000    0000054    00024
  00016      00132    00124
```

$$\frac{2 \times 437}{902 + 1214 + (2 \times 437)} = 0.292\ (29\ \%)\ \text{Intra-office ratio}$$

*** PRACTICE EXERCISE ***

Use the report below to calculate the intra-office ratio for station to station traffic.

```
104  TFC001
00
  00000    0000478    00217
  00000    0000821    00569
  00000    0000210    00255
  00000    0000053    00024
  00002      00080    00080
```

*** ANSWER ***

$$\frac{2 \times 210}{478 + 821 + (2 \times 210)} = 0.244 \text{ (24 \%) Intra-office ratio}$$

Take a look at the TFC001 report below.

200 TFC001

00

00000	0000092	00072
00000	0000114	00074
00000	0000063	00083
00000	0000005	00003
00001	00016	00000

Using the report above you will review the steps that are recommended to be taken when looking at this report.

- Check for FTMs

  NO FTMs stop

  If FTMs are present-continue

- Use the formula to check blockage

  Is the blockage within the recommended percentage?

  YES, then you are ok.

  NO, then you might need to add equipment and/or rebalance.

Take a look at another report that does have some FTMs.

```
427  TFC001
00
  00001          0003413          02377
  00001          0005124          03199
  00000          0000833          01322
  00000          0000358          00213
  00059            00603          00332
```

What is the percent of blockage for INCOMING TRAFFIC? Use the formula.

$$\frac{1}{2377 + 1} \times 100 = 0.04\% \text{ Incoming Blockage}$$

Well it's within the recommended 1% blockage; therefore, this one is okay.

What is the percent of blockage for outgoing traffic? Again, use the formula.

$$\frac{1}{3199 + 1} \times 100 = 0.03\% \text{ Outgoing Blockage}$$

This one is also within the recommended 4% blockage; therefore, this one is also okay.

If you understand everything up to this point then continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Using the report below answer the questions that follow.

```
427  TFCØØ1
ØØ
  ØØØØ2          ØØØ3413          Ø2377
  ØØØØØ          ØØØØ9ØØ          Ø1392
  ØØØØ1          ØØØ5137          Ø3212
  ØØØØØ          ØØØØ358          ØØ213
  ØØØ59            ØØ6Ø3          ØØ332
```

1. What is the percent of blockage for intra-customer traffic?

   _____

2. What is the percent of blockage for INCOMING TRAFFIC?

   _____

*** ANSWER ***

1. What is the percent of blockage for intra-customer traffic?

   .Ø3% blockage

$$\frac{1}{3212 + 1} \quad X\ 1ØØ = Ø.Ø3$$

2. What is the percent of blockage for incoming traffic?

   .Ø8% blockage

$$\frac{2}{2377 + 2} \quad X\ 1ØØ = Ø.Ø8$$

The TFC001 data may also be used to indicate what percentage of total system traffic is incoming, outgoing, intracustomer, or tandem. The procedure is to find the sum of the incoming CCS, outgoing CCS, intracustomer CCS, and tandem CCS figures, then divide each of the above figures by the sum of all CCS values. This kind of information is useful in determining trunking needs, customer calling characteristics, or any other type of engineering need for which this information is required.

The formula is:

$$\frac{\text{Incoming CCS (or Outgoing CCS, Intracustomer CCS, or Tandem CCS)}}{\text{Incoming CCS + Outgoing CCS + Intracustomer CCS + Tandem CCS}} \times 100 = \% \text{ of Total System Traffic}$$

Repeat for each type.

Another useful item that can be calculated from the TFC001 data is the average holding time for each type of call. In combination with the percentage of total traffic for each type of call, this information, which also represents the customer's calling characteristics, can be used in the same manner as the percentages of each type of call, or to possible causes of other problems in the system (such as high real time usage).

The formula is:

$$\frac{\text{CCS}}{\text{Peg Count}} = \frac{\text{XXX}}{.06} \quad \text{(to convert to minutes)}$$

Repeat for each type of call - incoming, outgoing, intracustomer, and tandem.

EXAMPLE:

INCOMING CCS

200 TFC001

00

```
00000    0000092    00072
00000    0000114    00074            92
00000    0000063    00083    ----------------- X 100 = Incoming CCS
00000    0000005    00003    92 + 114 + 63 + 5          33.5% of total
00001      00016    00000                               system traffic
```

This data will vary according to the customer's method of operation and nature of business. However, for manyu customers, representative holding times for each type of call are as follows:

- Incoming calls: 3 - 3.5 minutes.
- Outgoing calls: 2 - 3 minutes.
- Intracustomer calls: 30 seconds - 1.5 minutes.
- Tandem calls: 4 - 5 minutes.

SUMMARY OF TFCØØ1 NETWORK REPORT :

- Details traffic within each customer group.
- All data is on a per call basis.
- Ideally 1% or less blockage for incoming, outgoing, and tandem calls.
- Ideally 4% or less blockage for intra-customer calls.
- Formula for calculating blockage:

$$\frac{\text{(TYPE) FTM}}{\text{(TYPE) PEG COUNT + (TYPE) FTM}} \times 100 = \% \text{ Blockage}$$

- Blockage that is higher than recommended may require the addition of equipment and/or rebalancing.
- The intra-office ratio indicates the ratio of station - to - station traffic to total station traffic.
- The percentage of total system traffic represented by incoming, outgoing, intracustomer, and tandem calls and the average holding time of each may also be calculated.

This concludes the review of the TFCØØ1 NETWORK REPORT. If any information reviewed up to this point is unclear please take the time to review before continuing. The four customer reports that follow are related to specific customer data that will sometimes refer back to this report.

The second customer report you will review is the TFSØØ2 TRUNK TRAFFIC . This report consists of incoming and outgoing CCS, and peg counts for each trunk group, as well as other peg counts regarding the status of trunks in that route and the amount of blockage on that route.

EXAMPLE TFCØØ2 TRUNK TRAFFIC REPORT

```
2ØØ  TFCØØ2

Ø7

ØØ4  CO

ØØØØ8              ØØØØ7

ØØØØØ51            ØØØ43
ØØØØØØ4            ØØØØ4
  ØØØØØ            ØØØØØ
  ØØØØ6
```

This column is called GROUP NUMBER.
It indicates the number of the trunk group.

```
200  TFC002

Ø7

ØØ4  CO

ØØØØ8           ØØØØ7

ØØØØØ51         ØØØ43
ØØØØØØ4         ØØØØ4
  ØØØØØ         ØØØØØ
  ØØØØ6
```

This column is called TRUNK TYPE.
Turn to page 4-3 in the NTP to see the 11 trunk types.

RETURN HERE AFTER YOU HAVE LOOKED AT THE NTP

```
200  TFC002

Ø7

ØØ4  CO

ØØØØ8           ØØØØ7

ØØØØØ51         ØØØ43
ØØØØØØ4         ØØØØ4
  ØØØØØ         ØØØØØ
  ØØØØ6
```

This column is called TRUNKS EQUIPPED.
It gives the number of trunks configured in the route at the time of printing.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

If you understand the information up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Using the example report, answer the questions below.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

1. What type of trunk does this report indicate? _____

2. How many equipped trunks does this report indicate? _____

*** ANSWER ***

1. What type of trunk does this report indicate? (CO) CENTRAL OFFICE

2. How many equipped trunks does this report indicate? (8) eight

If you had any problems with this exercise it is recommended that you review before continuing.

This column is called TRUNKS WORKING.
It indicates the number of working trunks at the time of printing.

```
200  TFC002

07

004  CO

00008              00007

0000051            00043
0000004            00004
  00000            00000
  00006
```

This column is called INCOMING USAGE.
It does not start accumulating until answer supervision is returned to the central office. It will not peg until the connection is idled.

```
200  TFC002

07

004  CO

00008              00007

0000051            00043
0000004            00004
  00000            00000
  00006
```

This column is called INCOMING PC.
It gives a peg count for each time an incoming trunk was seized in this group and resulted in an established call. Incoming PC does not peg until the call is idled.

```
200  TFC002

07

004  CO

00008              00007

0000051            00043
0000004            00004
  00000            00000
  00006
```

If you understand the information up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Using the report below, answer the questions that follow.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

1. What is the peg count for the number of times incoming trunks were used in this route? _____

2. What is the number of working trunks? _____

3. The number "51" on the report is called? _____

*** ANSWER ***

1. What is the peg count for the number of times incoming trunks were used in this route? (43) FORTY THREE

2. What is the number of working trunks? (7) SEVEN

3. The number "51" on the report is called? INCOMING USAGE

If you had any problems with this exercise it is recommended that you review before continuing.

This column is called OUTGOING USAGE.
This indicates the total time an outgoing trunk was involved in an established call. It begins to accumulate as soon as the end - of - dialing timer times out, regardless of whether the call is answered or not. It will not peg until the connection is idled.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

This column is called OUTGOING PC.
It gives a peg count for each time an outgoing trunk in this group was seized and resulted in an established call. It will peg for all calls which completed dialing, regardless of the fate of the call, but will not peg until the connection is idled.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

This column is called OUTGOING OVERFLOW.
It is a count of the number of call attempts over that route which were blocked due to an ATB condition.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

If you understand the information up to this point continue on to the practice exercise on the next page.

*** PRACTICE EXERCISE ***

Use the report to answer the questions.

```
200  TFC002

07

004  CO

00008            00007

0000051          00043
0000004          00004
  00000          00000
  00006
```

1. What is the outgoing peg count for the number of times trunks were used in this route? _____

2. What is the CCS for outgoing trunk calls? _____

3. The outgoing overflow column contains the number six (6)?

   TRUE or FALSE

*** ANSWER ***

1. What is the outgoing peg count for the number of times trunks were used in this route? (4) FOUR

2. What is the CCS for outgoing trunk calls? (4) FOUR

3. The outgoing overflow column contains the number six (6)?

   TRUE or **FALSE**

If you said TRUE to question number three you probably were looking at the TOLL PC which contains the number 6. The overflow column contains the number Ø.

If you had any problems with this exercise it is recommended that you review before continuing.

This column is called ALL TRUNKS BUSY.
It is only valid for trunks with more than one equipped member; incremented whenever the last idle, enabled trunk is made busy.

```
2ØØ  TFCØØ2

Ø7

ØØ4  CO

ØØØØ8          ØØØØ7

ØØØØØ51        ØØØ43
ØØØØØØ4        ØØØØ4
  ØØØØØ        ØØØØØ
  ØØØØ6
```

This column is called TOLL PC . llamadas por cobrar
It is a count of the number of times a toll call was dialed on a CO or FEX route. ("Ø" or "1" is dialed as the first or second digit after the access code.) It will peg as soon as the first digit (after Ø, 1) is dialed even if the call was not completely dialed.

```
2ØØ  TFCØØ2

Ø7

ØØ4  CO

ØØØØ8            ØØØØ7

ØØØØØ51          ØØØ43
ØØØØØØ4          ØØØØ4
  ØØØØØ          ØØØØØ
  ØØØØ6
```

*** PRACTICE EXERCISE ***

Use the report to answer the questions.

```
2ØØ  TFCØØ2

Ø7

ØØ4  CO

ØØØØ8            ØØØØ7

ØØØØØ51          ØØØ43
ØØØØØØ4          ØØØØ4
  ØØØØØ          ØØØØØ
  ØØØØ8
```

1. What is the number in the all trunks busy column? _____

2. What is the toll PC on this report? _____

*** ANSWER ***

1. What is the number in the all trunks busy column? (Ø) ZERO.

2. What is the toll PC on this report? (8) EIGHT

If you had any problems with this exercise it is recommended that you reveiw before continuing.

The first part of the review of the TFCØØ2 report covered only the columns and what they were. Now the module will go into detail and explain the contents and relationships of the data in these columns.

All of the data that you will be reviewing may vary from system to system depending on traffic, size, etc.

Data in this section consists of incoming and outgoing CCS and peg counts for each trunk group, as well as information regarding the status of the trunks and the amount of blockage on each route. In this section, blockage on a group of trunks is the statistical probability that a call will be blocked, or unable to be completed, due to lack of an idle, enabled trunk.

First take a look at what is considered to be ideal data for the TFCØØ2 report.

Ideal data may include:

- High ATB's and low overflows on outgoing or two-way routes.
- Zero or low toll peg counts on CO and FEX routes.
- Zero or low ATB's on DID or other incoming routes.

For most types of trunks, there is an industry-accepted standard grade of service to which most systems are engineered, which is known as the recommended maximum blockage. These values are:

TRUNK TYPE	RECOMMENDED MAX. BLOCKAGE
CO	1 %
DID, FEX, TIE, WATS	2 % - 5 %

Northern Telecom uses the above figures for the recommended maximum blockage for the above types of trunks.

NOTE: The type of trunks having a higher level of blockage are known as special service trunks, and are allowed that level of blockage due to their high cost.

There are several formulas developed by mathematicians regarding the nature of trunk traffic in a switching system; treatment of a blocked call; and the criteria for the grade of service. These may be used to determine the number of trunks required for the recommended grade of service on a given route. The most commonly used formulas are based on the Poisson, Erlang B, and Erlang C theories. The basic assumptions behind these theories are:

Poisson (Blocked Calls Held)

Calls that find no idle trunk remain in the system for the period that they would have occupied if they had been connected, and then leave the system. Time in the system is equal to the expected call duration.

Erlang B (Blocked Calls Cleared)

Calls which find no idle trunk are cleared immediately from the system. Time in the system is zero.

Erlang C (Blocked Calls Delayed)

Calls which find no idle trunk wait in a queue until a trunk is free and then are connected normally. Time in the system is equal to the waiting time plus the expected call duration.

For the Poisson and Erlang B formulas, the grade of service criteria is the percentage of calls blocked. This applies to systems in which there is no queuing for a trunk group. Switching systems that allow queuing deal with delayed rather than blocked calls, and the grade of service criteria becomes the ratio between the average queuing time and the average holding time per call. In a delay system, the traffic carried (i.e., the calls that are actually completed) equals the traffic offered (i.e., the total number of calls that need to be completed over that route). In non-queuing system, the traffic carried is equal to the total CCS carried by trunks in a given route, and the traffic offered may be calculated from the grade of service being provided by that route, using the formula:

$$\text{Traffic offered} = \frac{\text{Traffic carried}}{1 - \text{blockage (GOS)}}$$

The GOS is usually expressed as the probability of blockage, and written "P.XX", where XX is the percentage of blockage in decimal form. (The "P" stands for probability, not Poisson). In Meridian SL-1 traffic measurements, the overflow peg count may be used to calculate the blockage, and the sum of the incoming CCS and the outgoing CCS may be used to represent the traffic carried. These figures may be plugged into the formula above to determine the actual demand being offered to trunks in that route.

In the TFC002 report the overflow peg count indicates the total number of attempts to seize a trunk in that route after all trunks are made busy. This will peg only once, whether the system diverts the call to another route (through ARS/NARS/BARS) or the user activates Ring Again against that route. This peg count can be used to calculate the actual percentage of blockage for outgoing calls only on that route, using the formula:

$$\frac{\text{OVERFLOW PEG COUNT}}{\text{Outgoing Peg Count + Overflow Peg Count}} \times 100 = \% \text{ Blockage}$$

The overflow peg count does not apply to incoming calls, as this information never reaches the Meridian SL-1. For incoming routes, overflow information must be obtained from the serving central office. However, it may be approximated by using the Poisson or Erlang B tables and the total CCS carried by that route.

Take a look at the report.

```
200  TFC002

07

004  CO

00008              00007

0000051            00043
0000004            00004
  00008            00004
  00006
```

The report above will be used to calculate the percent of blockage using the formula previously mentioned. By doing this you will be able to see if the percent of blockage is above the recommended maximum of 1%.

$$\frac{8}{4 + 8} \quad X\ 100 = 66.6\ \%\ \text{Blockage}$$

This figure is blockage based on overflow. This type of comparison will help identify if there is a need to add more trunks. If the percentage of blockage is >1%, it is generally recommended that trunks be added.

REMEMBER:

Maximum Trunk Blockage:

Trunk Type	Maximum Blockage
CO	1%
DID, FEX, TIE, WATS	2% - 5%

*** PRACTICE EXERCISE ***

Use the report to answer the question.

200 TFC002

00

002 CO

1. What is the blockage based on overflow? _____

00008	00007
0000096	00022
0000030	00080
0000003	00001
00000	

*** ANSWER ***

1. What is the blockage based on overflow? 3.6%

$$\frac{3}{80 + 3} \times 100 = 3.6\%$$

When this number is >1% , adding trunks should be considered.

If you had any problems with this exercise it is recommended that you review before continuing.

Another useful figure that can be calculated from the traffic data is the CCS per trunk. This is the total CCS divided by the total number of trunks enabled (or equipped, if the same as number enabled).

$$\frac{\text{TOTAL CCS (INCOMING + OUTGOING CCS)}}{\text{Trunks enabled}} = \text{CCS Per Trunk}$$

As each trunk can conceivably carry a maximum of 36 CCS* each, this will give a rough estimate of the amount of usage a route receives. However, this should not be interpreted to mean that the total CCS capacity for a given route is 36 CCS times the number of trunks in the route. That would be the maximum CCS that a route could carry, representing 100 % blockage for anyone else attempting to use that route. The actual CCS capacity is derated, and comes from either the Poisson or Erlang B tables. It is the value of CCS which corresponds to the total number of trunks equipped and the recommended maximum blockage for the type of route (read from a Poisson or Erlang B table).

* It is possible for a trunk to accrue usage on the traffic printout greater than 36 CCS during one hour. This occurs because CCS and peg counts are not accumulated until the connection is idled. A connection that began in one time period and ended in another will cause the CCS for the second time period to be inflated by the amount of time used in the first time period, and consequently, the data for the first time period to be lower than was actually the case. A pattern of low-and-high CCS over a number of consecutive hours on a route with 1 or 2 members will indicate that this is happening.

EXAMPLE: CCS Per Trunk

02 WATT

00006	00006
0000000	00000
0000131	00082
00056	00028
00000	

$$\frac{131}{6} = 22 \text{ CCS Per Trunk}$$

This information is useful for load balancing purposes. Routes which average 25 CCS per trunk or higher may be considered "high-usage" trunks; routes which average 20-25 CCS per trunk may be considered to have "average" usage; and routes which average 20 CCS or lower may be considered to be "low-usage" trunks.

If you understand everything up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Use the report to answer the question.

```
Ø2   WATT

  00005          00005

0000000          00005
0000145          00087
  00062          00031
  00000
```

1. Calculate the CCS per trunk. CCS per trunk = _____

*** ANSWER ***

1. Calculate the CCS per trunk. CCS per trunk = 29

$$\frac{145}{5} = 29 \text{ CCS per trunk}$$

If you had any problems with this exercise please review before continuing.

The CCS per trunk can be used in another formula to determine the percent utilization of a route, which is calculated as follows:

$$\frac{\text{CCS/Trunk}}{36} \times 100 = \% \text{ Utilization}$$

Work through one of the formulas using the report below.

```
Ø2   WATT

                                        (CCS per trunk, previous formula)
  ØØØØ6          ØØØØ6        22      X 1ØØ = 61% Utilization
                                36
ØØØØØØØ          ØØØØØ
ØØØØ131          ØØØ82
  ØØØ56          ØØØ28
  ØØØØØ
```

The higher the CCS per trunk, the more efficiently a route is being utilized. Removing trunks on routes that are over equipped will improve the utilization of the remaining trunks, as long as the traffic offered remains at the same level. If the amount of usage on a group increases as the number of available trunks increases, then adding trunks will increase the utilization. In most cases, larger trunk groups are more efficient than smaller routes, due to economy of scale.

If you understand everything up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Use the report below and the CCS per trunk (29) calculation that you calculated before to answer the question that follows.

```
Ø2   WATT

  ØØØØ5          ØØØØ5

ØØØØØØØ          ØØØØØ
ØØØØ145          ØØØ87
  ØØØ62          ØØØ31
  ØØØØØ
```

1. What is the percent of utilization for this report?

*** ANSWER ***

1. What is the percent of utilization for this report?

$$\frac{29}{36} \quad X\ 100 = 81\%\ \text{Utilization}$$

If you had any problem with this exercise it is recommended that you review before continuing.

Both incoming and outgoing trunks can also be monitored for utilization by observing the ATB peg count. The ATB peg count may often be seen to be considerably higher than the total peg count for a route, in which case it is to be disregarded. It is possible for this count to be higher than the total peg count, but not by more than a very small percentage. This can happen when a caller dials out on a trunk, then abandons the call before the EOD timer times out. If that trunk was the last idle, enabled trunk in the route, one ATB peg count will be incremented, but no trunk peg count will be pegged.

Before continuing complete the practice exercise.

*** PRACTICE EXERCISE ***

1. What is another way to monitor utilization of trunks?

*** ANSWER ***

1. What is another way to monitor utilization of trunks?

Monitor the (ATB) all trunks busy peg count .

You can use the ATB peg count to determine the % of calls seizing the last trunk. Now take a look at the formula used to calculate the percent of calls seizing the last trunk.

$$\frac{\text{ATB PEG COUNT}}{\text{Incoming Peg Count + Outgoing Peg Count + Overflow Peg Count}} \times 100 = \%\text{ of calls seizing last trunk}$$

Now work through one of these formulas using the report below.

```
Ø2   WATT

  ØØØØ6          ØØØØ6

ØØØØØØØ          ØØØØØ
ØØØØ131          ØØØ82
  ØØ056          ØØØ28
  ØØØØØ
```

$$\frac{28}{Ø + 82 + 56} \times 100 = 20.3\ \%\text{ of calls seizing last trunk}$$

It should be noted that ATB's, overflows, and a high percentage of calls seizing the last trunk in the route are not necessarily bad in themselves. In fact, high ATB's and low overflows are actually to be desired on outgoing or two-way routes, as this indicates that the route is being used efficiently but is providing a good grade of service. Likewise, a high percentage of calls seizing the last trunk may indicate efficient use of trunks, depending on circumstances. If this occurs on a last choice route in an alternate routing situation (such as ARS/NARS/BARS), however, it could mean that a large number of calls are being blocked. High ATB's and high overflows almost always mean high blockage on a route.

*** PRACTICE EXERCISE ***

Use the report below to answer the question that follows.

Ø2 WATT

00005	00005	
0000000	00000	
0000145	00087	
00062	00031	
00000		

1. What is the percent of calls seizing the last trunk?
   (NOTE: Rememember to use the formula.)

*** ANSWER ***

1. What is the percent of calls seizing the last trunk?

$$\frac{31}{87 + 62} \times 100 = 21\%$$

If you understand everything up to this point then continue to the practice exercise.

*** PRACTICE EXERCISE ***

1. High blockage on a route might be indicated by what?

2. High ATBs and low overflow for outgoing or two-way routes indicate what?

*** ANSWER ***

1. High blockage on a route might be indicated by what?

   High ATBs and high overflow almost always mean high blockage on a route.

2. High ATBs and low overflow for outgoing or two-way routes indicate what?

   This indicates that the route is being used efficiently, and providing a good grade of service.

If you had any problems with this exercise it is recommended that you review before continuing.

Another part of the data that might be helpful when interpreting this report is the average holding time per call on each route. The greater the holding time per call, the fewer the calls that can be carried, and the higher the probability of blockage. Holding times will vary according to the customer's application and method of operation. For most normal 8 - 5 type businesses, however, the average holding times may look like this:

(NOTE: The figures below are representative of some customers, but not all.)

- CO Trunks: 2-3 minutes
- WATS and other Special Service Trunks: 4-5 minutes

*** PRACTICE EXERCISE ***

1. What is the average holding time for CO Trunks seen for most customers ?

2. Blockage might be caused by what?

3. What is the average holding time for special service trunks seen for most customers?

*** ANSWER ***

1. What is the average holding time for CO Trunks seen for most customers ? 2-3 MINUTES

2. Blockage might be caused by what? A greater holding time per call

3. What is the average holding time for special service trunks seen for most customers? 4-5 MINUTES

If you had any problems with this exercise it is recommended that you review before continuing.

Now that you have reviewed the holding times for calls, take a look at the formula for calculating the average holding time per call.

Formula:

$$\frac{\text{INCOMING CCS + OUTGOING CCS}}{\text{INCOMING PEG COUNT + OUTGOING PEG COUNT}} = \frac{\text{XXX}}{\text{Ø.6}} = \text{HOLDING TIME IN MINUTES}$$

EXAMPLE: Calculating holding time.

```
Ø2   WATT

  ØØØØ6          ØØØØ6


ØØØØØØØ          ØØØØØ        131
ØØØØ131          ØØØ82        --- = 1.597
  ØØØ56          ØØØ28         82    -----   = 2.7 minutes holding time
  ØØØØØ                              Ø.6
```

As you can see, the 2.7 holding time is shorter than the 4-5 minute holding time discussed earlier.

REMEMBER: Holding times are characteristics of each customer, not something that can be regulated.

If you understand everything up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Use the report below to answer the question that follows.

```
Ø2   WATT

  ØØØØ5          ØØØØ5

ØØØØØØØ          ØØØØØ
ØØØØ145          ØØØ87
  ØØØ62          ØØØ31
  ØØØØØ
```

1. What is the average holding time per call? _____

*** ANSWER ***

1. What is the average holding time per call? 2.8 MINUTES

$$\frac{145}{87} = 1.666 = \frac{1.666}{\text{Ø.6}} = 2.8$$

If you had any problems with this exercise it is recommended that you review before continuing.

Now let's take a look at the Toll PC Column.

A high number of toll calls relative to the total peg count may indicate that the customer needs more trunks in his first-choice routes; or may need to reevaluate his alternative routing scheme, if ARS/NARS/BARS is present; or consider adding this feature, if it is not.

```
Ø2   CO

  ØØØØ5          ØØØØ5

ØØØØØØØ          ØØØØØ
ØØØØ145          ØØØ87
  ØØØ62          ØØØ31
  ØØØØ9
```

The toll peg count indicates the number of times a "1" or "Ø" was dialed, whether the call was actually completed or not. Therefore, it is possible for this peg count to be higher than the outgoing peg count for the route. The percentage of toll calls dialed can be calculated as follows:

$$\frac{\text{TOLL PEG COUNT}}{\text{OUTGOING PEG COUNT}} \times 100 = \% \text{ TOLL CALLS}$$

Let's work through one of these formulas using the report above.

$$\frac{9}{87} \quad X\ 100 = 10.3\%$$ TOLL CALLS FOR THE REPORT ABOVE

If you understand everything up to this point then continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Use the report below to answer the questions that follow.

```
177  TFC002

00
00    CO
  00007          00007

0000000          00000
0000183          00117
  00000          00169
  00010
```

1. What is the percentage of toll calls for this report?

2. If the percentage of toll calls on this report had exceeded 25% it may indicate the need to do what ?

*** ANSWER ***

1. What is the percentage of toll calls for this report? 8.5%

$$\frac{10}{117} \times 100 = 8.5\ \%\ \text{TOLL CALLS}$$

If you came up with a different answer check the following and then try the calculation again:

TOLL PC = 10
OUTGOING PC = 117 X 100 = %

2. If the percentage of toll calls on this report had exceeded 25% it might indicate the need to do what?

   Might require the addition of more trunks in the first-choice routes.

If you had any problems with this exercise it is recommended that you review before continuing.

SUMMARY OF TFCØØ2 TRUNKS REPORT :

- Data for each trunk group (Incoming & Outgoing CCS, PC)
- Trunks Equipped
- Trunks Enabled
- Recommended maximum blockage of 1% for CO trunks
- Recommended maximum blockage of 2-5% for DID, FEX, TIE, WATS Trunks
- Trunk CCS of 25 or higher indicates a "high usage" route
- Trunk CCS of 2Ø-25 indicates "average usage" route
- Trunk CCS less than 2Ø indicates "low usage" route
- Higher CCS per trunk indicates an efficiently used route
- Average holding times for CO trunks is generally 2-3 minutes
- Average holding times for WATS and other special service trunks is generally 4-5 minutes

In general, the best indication of any required change in trunking for any route is the presence of ATB's and overflows. Where these peg counts are present, the recommendation to add trunks is generally valid; where these peg counts are intermittent or absent the recommendation to make no changes or even to possibly delete trunks is generally valid.

This concludes the review of the TFCØØ2 Trunks Report. If any information reviewed up to this point is unclear please take the time to review before continuing. The next review will cover two customer reports, TFCØØ3 and TFCØØ4. Both of these reports are covered together due to their relationship. The TFCØØ3 report pertains to the treatment of calls as they enter the system via the attendants; whereas, the TFCØØ4 report pertains to individual attendants as they process calls. You will review the headings of both reports first and then review the data for each showing their relationships.

*** ANSWER ***

1. Briefly explain two reasons why the percentage of abandoned calls could be higher than recommended.

   a. Incoming calls are blocked between the trunk and the attendant, the caller hears ring back tone and thinks he is ringing the attendant.

   b. Attendant is selecting external calls over internal calls, the percentage of abandoned calls is most likely made up of internal calls, which may be acceptable to the customer.

2. If the high percentage of abandoned calls is external you really might not need to worry.

   TRUE OR **FALSE**

   This is definitely FALSE because these are your main users. In a hospital, the reverse is generally true, as internal calls may be patients and therefore would have a higher priority than external calls.

3. List one way that you might be able to decrease the percentage of abandoned calls?

   1. Eliminate any network blockage by rebalancing unevenly loaded loops.

Now that you know some of the causes of a high percentage of abandoned calls, take a look at the example below:

```
999  TFC003
ØØ
  ØØ243          ØØØ22
  ØØ347          ØØ263
  ØØØ9Ø          ØØ338
```

$$\frac{9Ø}{9Ø + 76 + 167 + 3 + 4 + 5Ø + 123} \times 1ØØ$$

= 17.5% of abandoned calls

```
999  TFC004
ØØ
Ø1
  ØØ076          ØØØØØ11
  ØØ167          ØØØØØ17
ØØØØØ36          ØØØØØ29
  ØØØØØ
Ø2
  ØØØØ3          ØØØØØØ1
  ØØØØ4          ØØØØØØ1
ØØØØØØ1          ØØØØØØ1
  ØØØØØ
Ø3
  ØØØ5Ø          ØØØØØØ7
  ØØ123          ØØØØØ16
ØØØØØ34          ØØØØØ23
  ØØØØØ
```

As you can see this is an extremely high percentage. We will discuss later some of the steps you can take to try and decrease this number.

If you understand everything up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

Use the report below to find the percent of abandoned calls.

1. Percent of abandoned calls is _____.

```
999  TFC003
ØØ
 ØØ125          ØØØ22
 ØØØ35          ØØ112
 ØØØ1Ø          ØØ15Ø

999  TFC004
ØØ
Ø1
  ØØØ93         ØØØØØ11
  ØØ213         ØØØØØ17
ØØØØØ36         ØØØØØ29
  ØØØØØ
Ø2
  ØØØ67         ØØØØØØ1
  ØØØ89         ØØØØØØ1
ØØØØØ36         ØØØØØØ1
  ØØØØØ
Ø3
  ØØØ45         ØØØØØØ7
  ØØØ86         ØØØØØ16
ØØØØØ36         ØØØØØ23
  ØØØØØ
```

*** ANSWER ***

1. Percent of abandoned calls is 1.6% .

$$\frac{1Ø}{93+213+67+89+45+86+1Ø} \times 1ØØ = 1.6\%$$

If you had any problems with this exercise it is recommended that you review before continuing.

The next part of the module will demonstrate how to look for additional causes of problems revealed in the TFCØØ3 data by examining the TFCØØ4 data.

If the total number of calls is too high for one attendant, all or most queue measurements could possibly be excessive. This may be seen in any system where the average number of calls handled by each console (sum of internal and external for all consoles divided by number of consoles in service) is excessive. The customer should either attempt to reduce the number of calls coming to the attendants (if a large percent are internal, he should perhaps publish and keep an updated company directory); increase the amount of time the consoles are staffed (if there is more than one and they are not manned 1ØØ%); or consider adding an additional console (if none of the above is feasible). As a more costly possibility, the customer could consider providing DID service directly to specific departments or individuals.

*** PRACTICE EXERCISE ***

List at least 3 things that the customer could do to reduce excessive queue measurements due to a high number of calls coming in to the attendants.

*** ANSWER ***

List at least 3 things that the customer could do to reduce excessive queue measurements due to a high number of calls coming in to the attendants.

1. Attempt to reduce the amount of calls coming to the console.
2. Increase the amount of time the consoles are staffed.
3. Add another console.
4. Install DID service.

If you had any problems with this exercise it is recommended that you review before continuing.

Now you know that the number of calls per attendant affects the queue measurements. Take a look at the example formula for calculating average calls per console.

```
999  TFC003
00
  00243          00022
  00347          00263
  00090          00338

999  TFC004
00
01
  00076          0000011   ATTENDANT  # 1   76+167  =  243 CALLS
  00167          0000017
0000036          0000029
  00000
02
  00003          0000001
  00004          0000001   ATTENDANT  # 2   3+4     =    7 CALLS
0000001          0000001
  00000
03
  00050          0000007   ATTENDANT  # 3   50+123  =  173 CALLS
  00123          0000016
0000034          0000023                TOTAL CALLS =  423
  00000
```

$$\frac{423 \quad \text{TOTAL CALLS}}{3 \quad \text{CONSOLES}} = 141 \text{ Average Calls per Console}$$

If you understand everything up to this point continue to the practice exercise.

*** PRACTICE EXERCISE ***

1. Use the report below to find the average amount of calls per console. What is the average amount of calls per console?

   _____

```
ØØØ  TFCØØ4

ØØ
Ø1

  ØØØØ3          ØØØØØØØ
  ØØØ9Ø          ØØØØØØ7
ØØØØØ2Ø          ØØØØØØ7
  ØØØØØ

Ø2

  ØØØ1Ø          ØØØØØØ2
  ØØ151          ØØØØØ11
ØØØØØ35          ØØØØØ13
  ØØØØØ

Ø3

  ØØØØ7          ØØØØØØ2
  ØØØ59          ØØØØØ6
ØØØØØ17          ØØØØØ8
  ØØØØØ
```

2. If you have a low number of calls per console you might want to reduce the amount of consoles in service.

   TRUE OR FALSE

*** ANSWER ***

1. What is the average amount of calls per console? 106.6

#1	3+90	= 93
#2	10+151	= 161
#3	7+59	= 66

TOTAL CALLS = 320 $\frac{320}{3 \text{ Consoles}}$ TOTAL CALLS = 106.6

2. If you have a low number of calls per console you might want to reduce the amount of consoles in-service.

TRUE OR FALSE

If you had any problems with this exercise please review before continuing.

The next topic to be reviewed will be the percent of time manned for all attendants or per attendant.

If the percentage of time manned is below the minimum of 85% for any system, you may see a high speed of answer, high percentages of delayed and abandoned calls, high wait times of calls in queue and abandoned calls, or all of these. When one or more consoles are staffed less than 85% of the hour (51 minutes), calls tend to stack up in queue, creating high queue wait times and large numbers of calls delayed. This in turn causes the average speed of answer to skyrocket. Increasing the percentage of time manned in the busy hours to at least 85% will decrease the number of calls that have to go into queue, as well as the time spent in queue, and, therefore, the average speed of answer.

There will be some cases where increasing the amount of time manned (if it is less than 85%) does not apply and is not necessary. This occurs in a system with two or more consoles, where one or more are open 85% - 100% of the time and the rest are open a very small percentage of time. In these cases, the percentage of time manned for all consoles will be deceptively low. If the primary consoles are open at least 85 % of the time and appear to be providing satisfactory services (low queue measurements, work time per call, etc.) it is not necessary that the time manned be increased. Of course, if the primary consoles are open less than 85% of the time and are not providing satisfactory service, then by all means this action should be taken. Ninety percent of all systems (with two or more consoles) that are experiencing problems show an insufficient amount of time manned, and the recommendation to increase the amount of time the consoles are manned is made more than any other recommendation. For some customers, this may mean providing relief operators to cover lunches, breaks, etc., instead of busying out the console, but the grade of service is guaranteed to improve.

Look at the example using the formula to determine the percent of time manned:

```
999  TFC004
ØØ
Ø1                          1#  36  TOTAL =  71/36X3   X 1ØØ = 65.7 % Manned
  ØØ076          ØØØØØ11
  ØØ167          ØØØØØ17
ØØØØØ36          ØØØØØ29
  ØØØØØ                      2#   1
Ø2
  ØØØØ3          ØØØØØØ1
  ØØØØ4          ØØØØØØ1    3#  34
ØØØØØØ1          ØØØØØØ1
  ØØØØØ
Ø3
  ØØ5Ø           ØØØØØØ7
  ØØ123          ØØØØØ16
ØØØØ34           ØØØØØ23
  ØØØØØ
```

As you can see this is well below the 85% recommended. However, since one of the consoles was open for only 1 CCS, this may be an example of the situation described above, in which the two primary consoles could be providing excellent service. In that case, it would not be necessary to increase the amount of time that console number 2 is staffed.

*** PRACTICE EXERCISE ***

Use the report below to calculate the percent of time the consoles are manned. Consoles are manned _____ %.

```
000  TFC004

00
01

  00003          0000000
  00090          0000007
0000020          0000007
  00000

02

  00010          0000002
  00151          0000011
0000035          0000013
  00000

03

  00007          0000002
  00059          0000006
0000017          0000008
  00000
```

*** ANSWER ***

Consoles are manned 66.6 %

#1 20 #2 35 #3 17 $\frac{72}{36 \times 3}$

Notice the low percentage.
If the queue measurements for these consoles were high, to resolve this problem you might want to try the following:

- Increase the time manned for all consoles during busy hours.
- Provide relief operators to cover lunches, breaks, etc. instead of busying out the console.

The next section of data you will review is the work time per call for all attendants. If the work time per call is excessive the result is similar to a low percentage of time manned in that there is not an available console to which the Meridian SL-1 can direct a call.

This may be seen in any system, but particularly those with DID service or an Attendant Message Center. To reduce the queue measurements, the customer may want to consider adding the Attendant overflow feature (i.e. establish someone at an SL-1 set to serve as a message center in addition to the attendants); or motivate the attendants to spend less time on each call, if possible. To shed more light on the latter the customer may determine which type of calls (internal or external) are requiring more processing time by calculating the work time per call on both internal and external calls separately (as explained later). Often simply knowing the source of the time-consuming calls or the identity of the callers will determine whether unproductive conversation can be eliminated. If it is not posible to do either of these, the customer's only alternative is to open an additional console to cover peak traffic.

* PRACTICE EXERCISE *

1. List three possible solutions that would help lower the work time per call.

*** ANSWER ***

1. List <u>three possible solutions</u> that would help lower the work time per call.

   1. Add the Attendant Overflow feature, i.e., establish someone at an SL-1 set to serve as a message center in addition to the attendant.

   2. Motivate the attendant to spend less time on each call, if possible.

   3. Open an additional console during the busy hour.

Look at the example formula for calculating % work time per call.

```
ØØØ  TFCØØ4


ØØ
Ø1                                #1    #2    #3
                                  7  +  13  +  8
  ØØØØ3          ØØØØØØØ    ----------------  X 1ØØ = 8.75 seconds
  ØØ9Ø           ØØØØØØ7    3+9Ø+1Ø+151+7+59
ØØØØØ2Ø          ØØØØØØ7
  ØØØØØ
                                As you can see this is a pretty good time
Ø2                              per call.  This may also be calculated on
                                an individual basis, for comparison.
                                Generally, the lower the work time per
                                call, the more efficient the attendants
  ØØ1Ø           ØØØØØØ2       will be.
  ØØ151          ØØØØØ11
ØØØØØ35          ØØØØØ13
  ØØØØØ

Ø3

  ØØØ7           ØØØØØØ2
  ØØ59           ØØØØØØ6
ØØØØØ17          ØØØØØØ8
  ØØØØØ
```

*** PRACTICE EXERCISE ***

Use the report below to calculate the work time per call in seconds.

1. Work time per call is _____ seconds.

```
999  TFC004
00
01
  00076          0000011
  00167          0000017
0000036          0000029
  00000
02
  00003          0000001
  00004          0000001
0000001          0000001
  00000
03
  00050          0000007
  00123          0000016
0000034          0000023
  00000
```

*** ANSWER ***

1. Work time per call is 12.5 seconds.

$$\frac{29 + 1 + 23}{76+167+3+4+50+123} \times 100 = 12.5 \text{ seconds}$$

If you had any problems with this exercise it is recommended that you review before continuing.

To calculate the work time per call for internal calls & external calls separately, use the same formula, substituting the internal or external work time for total work time, and the internal or external calls for total calls.

Example:

a.) Internal work time per call:

$$\frac{\#1 + \#2 + \#3}{3 + 10 + 7} = \frac{0 + 2 + 2}{20} = \frac{4}{20} \times 100 = 20 \text{ seconds}$$

b.) External work time per call:

$$\frac{\#1 + \#2 + \#3}{90 + 151 + 59} = \frac{7 + 11 + 6}{300} = \frac{24}{300} \times 100 = 8.0 \text{ seconds}$$

NOTE: The difference may be due to efficiency or to message-taking, etc.

If there is no blockage in the system, and the queue measurements show high percentages of delayed and abandoned calls with no other symptoms of trouble, the customer should investigate the attendant's method of operation and non call-processing activities for efficiency. Often the cause of a problem does not appear in the data, and the customer may simply need to consider a replacement.

SUMMARY OF TFC003 & TFC004 REPORTS :

TFC003

- Indicates treatment of calls as they enter the system via the attendant queue.
- Indicates problems in the handling of calls, through five primary measurements: Speed of Answer, Calls Delayed, and Abandoned call, and Wait Times of Delayed and Abandoned calls.

TFC004

- Provides more information related to the operation of the attendant console
- Indicates source of problems in the handling of calls, through three primary measurements: total calls, work time per call, and time manned.

This concludes the review of the TFC003-TFC004 reports. If any information that you have reviewed up to this point is unclear please take the time to review before continuing. The next review will cover the TFC005 Features Report. This is a very short report which basically reports data concerning the number of times a specific feature is being used.

The fifth and final report you will review is the TFC005-FEATURES . This report details the features used by a customer. Feature measurements differ widely from one customer to another. The difference in customer calling habits and system configuration prohibits comparisons of feature data.

EXAMPLE TFC005 FEATURE REPORT

```
200  TFC005

00

00              00012
01              00002
02              00003
03              00015
04              00002
05              00000
etc.
```

This column is called FEATURE NUMBER.
These are the features that are activated by keys on either an SL-1 set or an attendant console. Turn to the NTP in the index page 4-10 Table 4-F to see the list of features.

NOTE: Features activated by code dialing on 500 or 2500 sets are not included.

RETURN HERE WHEN YOU HAVE FINISHED REVIEWING THE FEATURES.

```
200  TFC005

00

00              00012
01              00002
02              00003
03              00015
04              00002
05              00000
etc.
```

This column is called PEG COUNT (PC).
A peg count is given for each feature for one specified customer.

```
200  TFC005

ØØ

ØØ              ØØØ12
Ø1              ØØØØ2
Ø2              ØØØØ3
Ø3              ØØØ15
Ø4              ØØØØ2
Ø5              ØØØØØ
etc.
```

*** PRACTICE EXERCISE ***

Use the report below to answer the questions that follow.

```
200  TFC005

ØØ

ØØ              ØØØ12
Ø1              ØØØØ2
Ø2              ØØØØ3
Ø3              ØØØ15
Ø4              ØØØØ2
Ø5              ØØØØØ
etc.
```

1. What are the feature numbers listed on this report? _____

2. What is the peg count for the call transfer feature?
   _____

*** ANSWER ***

1. What are the feature numbers listed on this report? _____
   ØØ, Ø1, Ø2, Ø3, Ø4, Ø5

2. What is the peg count for the call transfer feature?
   (15) FIFTEEN

If you had any problems with this exercise it is recommended that you review before continuing.

Currently there are 3Ø features as indicated on Page 4-1Ø Table 4-F in the NTP for this report. These features will be enhanced as the software is enhanced.

Two of the most important measurements in this report are:

- Peg Count for Ring Again
- Peg Count for Call Selection

Peg count for ring again is important because:

- The ring again peg count in this section pegs when this feature is activated against both stations (on a station-to-station call) and trunks (on a station-to-trunk call).

- Use of the ring again feature on outgoing trunk calls will improve the utilization of these trunks. Although a breakdown of ring-again usage is not provided by this measurement (this is provided only in TFC006, generics X05 and X09), this peg will provide at least an indication of any attempts to use this feature. TFC006 measurements represent only ring again against trunks.

The peg count for call selection is important because:

- The call selection peg count indicates the number of times that attendants selected a call out of queue using the incoming call indicator on the console. This may be used to provide additional insight into the attendant's method of operation. Although selecting a call out of queue (over the call that is ringing on the console) will not distort the measurements for attendant response time or wait time of calls in queue in TFC003, it could account for a high number of abandoned calls or high wait times of abandoned calls in that section. The customer should be aware of these consequences if call selection is heavily used as part of his method of operation.

Note: The peg count for attendant recall in this section does not represent the automatic recall of an attendant - extended call to a busy or no-answer station. Those calls are included in the peg count of internally - originated calls in TFC004, and do not peg separately anywhere in the traffic printout. The attendant recall feature associated with a key on an SL-1 set allows the user to include the attendant on an active call on his set by activating this key.

If you understand everything up to this point continue on to the practice exercise.

*** PRACTICE EXERCISE ***

1. Currently how many features are there for this report?

   _____

2. Name the two most important features for this report.

   _____ _____

3. Why is the peg count for ring again important?

   For additional information refer to the NTP in the appendix pages 4-9 - 4-11.

*** ANSWER ***

1. Presently how many features are there for this report?
   (30) THIRTY

2. Name the two most important features for this report.

   Peg Count for Ring Again Peg Count for Call Selections

3. Why is the peg count for ring again important?

   Use of the ring again feature on outgoing trunk calls will improve the utilization of these trunks .

If you had any problems with this exercise we recommend that you review before continuing.

SUMMARY OF TFC005 FEATURES REPORT :

- Details the features used by a customer.
- Features are activated by the keys on an SL-1 set or the attendant console.
- Currently there are 30 features.
- Use of the ring again feature on outgoing trunk calls will improve the utilization of these trunks.
- The call selection feature indicates if calls are being selected from the attendant queue.
- The number of calls selected from queue can provide additional insight into the attendant's method of operation.

This concludes the review of TFC005. It is recommended that you review any of the information that is unclear before continuing.

MODULE FIVE SELF CHECK

This self check has two parts:

- Part one requires you to analyze customer traffic reports.
- Part two requires you to select recommended action(s) you would take in resolving traffic problems found in part 1.

PART 1.

Analyze the traffic reports below as outlined in this module.

Write the results of your analysis on the pages that follow.

```
001  TFC001
00

  00000      0000532      00310
  00000      0000816      00485
  00000      0000907      01019
  00000      0000005      00006
  00014        00000      00000

001  TFC002

00
00   CO

  00033          00033

0000353          00203
0000221          00137
  00000          00000
  00011

01   WATT

  00004          00004

0000000          00000
0000032          00018
  00000          00004
  00000
```

```
Ø2   FEX

  ØØØØ3          ØØØØ3

 ØØØØØØ2          ØØØØ1
 ØØØØØØ1          ØØØØ1
   ØØØØØ          ØØØØØ
   ØØØØØ


Ø4   FEX

  ØØØ11          ØØØ11

ØØØØ165          ØØØ67
ØØØØ239          ØØØ79
  ØØØ17          ØØØ87
  ØØØØ2

ØØ1  TFCØØ3

ØØ
  ØØØ5Ø          ØØØ2Ø
  ØØØ89          ØØØ97
  ØØØØ8          ØØ127

ØØ1  TFCØØ4

ØØ
Ø1

  ØØØØ3          ØØØØØØ1
  ØØ134          ØØØØØ12
ØØØØØ31          ØØØØØ13
  ØØØØØ

Ø2

  ØØØØ8          ØØØØØØ4
  ØØ125          ØØØØØ12
ØØØØØ33          ØØØØØ15
  ØØØØØ

Ø3

  ØØØØ1          ØØØØØØ1
  ØØØ16          ØØØØØØ2
ØØØØØØ5          ØØØØØØ3
  ØØØØØ
```

001 TFC005

00	
00	00202
01	00000
02	00160
03	00000
04	00002
05	00106
06	00019
07	00037
08	00000
09	00000
10	00002
11	00024
12	00003
13	00000
14	00099
15	00007
16	00016
17	00024
18	00000
19	00000
20	00000
21	00000
22	00000
23	00000
24	00000
25	00000
26	00000
27	00000
28	00000
29	00000

Write your analysis of the reports in the appropriate space provided.

YOUR TFC001 ANALYSIS RESULTS :

YOUR TFC002 ANALYSIS RESULTS :

YOUR TFCØØ3 ANALYSIS RESULTS :

YOUR TFC00Ø4 ANALYSIS RESULTS :

YOUR TFC00Ø5 ANALYSIS RESULTS:

Turn the page for the answers.

PART 1.

TFC001 ANALYSIS RESULTS :

1. Intra-office ratio:

$$\frac{2 \times 907}{532 + 816 + (2 \times 907)} \times 100 = 57\%$$

2. Incoming calls:

$$\frac{532}{310} = \frac{1.71}{0.6} = 2.8 \text{ minutes holding time}$$

3. Outgoing calls:

$$\frac{816}{485} = \frac{1.68}{0.6} = 2.8 \text{ minutes holding time}$$

4. Intracustomer calls:

$$\frac{907}{1019} = \frac{0.890}{0.6} = 1.5 \text{ minutes holding time}$$

5. Tandem calls:

$$\frac{5}{6} = \frac{0.83}{0.6} = 1.4 \text{ minutes holding time}$$

6. Percent of total traffic which is incoming:

$$\frac{532}{2260} = 24\%$$

Outgoing;

$$\frac{816}{2260} = 36\%$$

TFCØØ1 CONTINUED:

Intracustomer;

$$\frac{907}{2260} = 40\%$$

Tandem;

$$\frac{5}{2260} = .2\%$$

TFCØØ2 ANALYSIS RESULTS :

GROUP ØØ

$$\frac{574}{33} = 17.39 \text{ CCS PER TRUNK}$$

$$\frac{17}{36} \times 100 = 47\% \quad \text{PERCENT UTILIZATION}$$

$$\frac{0}{137 + 0} \times 100 = 0\% \quad \text{PERCENT OF CALLS SEIZING LAST TRUNK}$$

$$\frac{574}{340} = 1.7 \qquad \frac{1.7}{0.6} = 2.8 \text{ MINUTES HOLDING TIME}$$

$$\frac{0}{137 + 0} \times 100 = 0\% \quad \text{BLOCKAGE BASED ON OVERFLOW}$$

$$\frac{11}{137} \times 100 = 8\% \text{ TOLL CALLS}$$

TFC002 CONTINUED:

GROUP 01

$$\frac{32}{4} = 8 \text{ CCS PER TRUNK}$$

$$\frac{8}{36} \times 100 = 22\ \% \text{ UTILIZATION}$$

$$\frac{4}{18} \times 100 = 22.2\ \% \text{ PERCENT OF CALLS SEIZING LAST TRUNK}$$

$$\frac{32}{18} = 1.7 \qquad \frac{1.7}{0.6} = 2.9 \text{ MINUTES HOLDING TIME}$$

$$\frac{0}{18 + 0} \times 100 = 0\% \text{ BLOCKAGE BASED ON OVERFLOW}$$

Note: Toll peg count not applicable.

GROUP 02

$$\frac{3}{3} = 1 \text{ CCS PER TRUNK}$$

$$\frac{1}{36} \times 100 = 3\ \% \text{ PERCENT UTILIZATION}$$

$$\frac{0}{1 + 0} \times 100 = 0\ \% \text{ PERCENT OF CALLS SEIZING LAST TRUNK}$$

$$\frac{3}{2} = 1.5 \qquad \frac{1.5}{0.6} = 2.5 \text{ MINUTES HOLDING TIME}$$

$$\frac{0}{1 + 0} \times 100 = 0\% \text{ BLOCKAGE BASED ON OVERFLOW}$$

$$\frac{0}{1} \times 100 = 0\% \text{ TOLL CALLS}$$

GROUP Ø4

$$\frac{4Ø4}{11} = 36.7 \text{ CCS PER TRUNK}$$

$$\frac{36.7}{36} \times 1ØØ = 1Ø1\ \% \text{ PERCENT UTILIZATION}$$

$$\frac{87}{79+17+67} \times 1ØØ = 58.78\% \text{ PERCENT OF CALLS SEIZING LAST TRUNK}$$

$$\frac{4Ø4}{146} = 2.7 \qquad \frac{2.7}{Ø.6} = 4.6 \text{ MINUTES HOLDING TIME}$$

$$\frac{17}{79 + 17} \times 1ØØ = 17.7\% \text{ BLOCKAGE BASED ON OVERFLOW}$$

$$\frac{2}{79} \times 1ØØ = 2.5\% \text{ TOLL CALLS}$$

TFCØØ3 ANALYSIS RESULTS :

- Average speed of answer = 5.Ø Seconds
- Average attendant response time was 2.Ø Seconds
- Wait time of calls in queue = 9.7 Seconds
- Wait time of abandoned calls = 12.7 Seconds

PART 1 CONTINUED

TFC004 ANALYSIS RESULTS :

TOTAL # OF CALLS HANDLED FOR THIS CUSTOMER:

$$3 + 134 + 8 + 125 + 1 + 16 = \frac{287}{3} = 96 \text{ CALLS PER CONSOLE}$$

PERCENTAGE OF DELAYED CALLS

$$\frac{89}{3 + 134 + 8 + 125 + 1 + 16} \times 100 = 31\ \%$$

PERCENTAGE OF ABANDONED CALLS

$$\frac{8}{295} \times 100 = 2.7\ \%$$

AVERAGE WORK TIME PER CALL FOR ALL CONSOLES:

$$\frac{13 + 15 + 3}{3 + 134 + 8 + 125 + 1 + 16} \times 100 = 10.8 \text{ seconds}$$

AVERAGE TIME MANNED FOR ALL CONSOLES:

$$\frac{31 + 33 + 5}{36 \times 3} \times 100 = 64\ \%$$

CONSOLE 01

TOTAL # OF CALLS: $3 + 134 = 137$

PERCENTAGE OF TIME MANNED: $\frac{31}{36} \times 100 = 86\ \%$

WORK TIME PER CALL:

INTERNAL $\frac{1}{3} \times 100 = 33.3$ SECONDS

EXTERNAL $\frac{12}{134} \times 100 = 8.9$ SECONDS

ALL CALLS $\frac{13}{137} \times 100 = 9.4$ SECONDS

CONSOLE 02

TOTAL # OF CALLS: 8 + 125 = 133

PERCENTAGE OF TIME MANNED: $\frac{33}{36} \times 100 = 91.6\ \%$

WORK TIME PER CALL:

INTERNAL $\frac{4}{8} \times 100 = 50$ SECONDS

EXTERNAL $\frac{12}{125} \times 100 = 9.6$ SECONDS

ALL CALLS $\frac{15}{133} \times 100 = 11$ SECONDS

TFCØØ4 CONTINUED:

CONSOLE Ø3

TOTAL # OF CALLS: 1 + 16 = 17

PERCENTAGE OF TIME MANNED: $\frac{5}{36} \times 100 = 13.8\ \%$

WORK TIME PER CALL:

INTERNAL $\frac{1}{1} \times 100 = 100$ SECONDS

EXTERNAL $\frac{2}{16} \times 100 = 12.5$ SECONDS

ALL CALLS $\frac{3}{17} \times 100 = 17.6$ SECONDS

TFCØØ5 ANALYSIS RESULTS

Ring again peg count = 24

Call selection peg count = 24

PART 2

Use the traffic analysis results from the previous pages to answer the following question(s).

1. Place an (X) by the action(s) you would take to resolve the problems found in TFCØØ1.

RECOMMENDED ACTION

1. _____ Reprimand users for using their telephones too much on station-to-station calls.

2. _____ Rebalance the system to eliminate blockage.

3. _____ No action required.

2. Place an (X) by the action(s) you would take to resolve the problem(s) found in TFCØØ2.

RECOMMENDED ACTION

ROUTE Ø:

1. _____ No action required.

2. _____ Add more trunks.

3. _____ Decrease the number of trunks.

ROUTE 1:

1. _____ No action required.

2. _____ Add more trunks.

3. _____ Decrease the number of trunks.

ROUTE 2:

1. _____ No action required.

2. _____ Add more trunks.

3. _____ Decrease the number of trunks.

ROUTE 4:

1. _____ No action required.

2. _____ Add more trunks.

3. _____ Decrease the number of trunks.

3. Place a check mark by the action(s) you would take to resolve the problem(s) found in TFCØØ3 and TFCØØ4.

RECOMMENDED ACTION

1. _____ No action required.
2. _____ Add the attendant overflow feature.
3. _____ Add more consoles.
4. _____ Increase the amount of time that the consoles are staffed.

4. Place a check mark by the action(s) you would take to resolve the problems found in TFCØØ5.

RECOMMENDED ACTION

1. _____ Remove all speed call lists since no one ever uses them.
2. _____ Commend users for making more efficient use of trunks by using the Ring Again feature.
3. _____ Reprimand users for using Volume Control too much.

PART 2 CONTINUED

*** ANSWER ***

1. Place an (X) by the action(s) you would take to resolve the problems found in TFCØØ1.

RECOMMENDED ACTION

1. _____ Reprimand users for using their telephones too much on station-to-station calls.
2. _____ Rebalance the system to eliminate blockage.
3. __X__ No action required.

2. Place a check mark by the action(s) you would take to resolve the problem(s) found in TFCØØ2.

RECOMMENDED ACTION

ROUTE Ø:

1. __X__ No action required.
2. _____ Add more trunks.
3. __X__ Decrease the number of trunks.

ROUTE 1:

1. __X__ No action required.
2. _____ Add more trunks.
3. _____ Decrease the number of trunks.

ROUTE 2:

1. __X__ No action required.
2. _____ Add more trunks.
3. __X__ Decrease the number of trunks.

ROUTE 4:

1. _____ No action required.
2. __X__ Add more trunks.
3. _____ Decrease the number of trunks.

3. Place a check mark by the action(s) you would take to resolve the problem(s) found in TFCØØ3 & TFCØØ4.

RECOMMENDED ACTION

1. __X__ No action required.
2. _____ Add the attendant overflow feature.
3. _____ Add more consoles.
4. __X__ Increase the amount of time that the consoles are staffed.

Both one and four are correct depending on your particular requirements.

4. Place a check mark by the action(s) you would take to resolve the problems found in TFCØØ5.

RECOMMENDED ACTION

1. _____ Remove all speed call lists since no one ever uses them.
2. __X__ Commend users for making more efficient use of trunks by using the Ring Again feature.
3. _____ Reprimand users for using Volume Control too much.

This concludes the self check for module five. Continue on to module six if you understand the information presented in this module.